

March 4. 1600

A
DISCOVERSE
OF A
METHOD
FOR
The wel-guiding
OF
REASON,

And the discovery of *Truth*
in the
SCIENCES.

Being a Translation out of that
famous Philosopher
Renaldus Des Cartes.

London, Printed by *Tho. Newcomb*, for
John Holden, at the Anchor in the
New-Exchange, 1649.

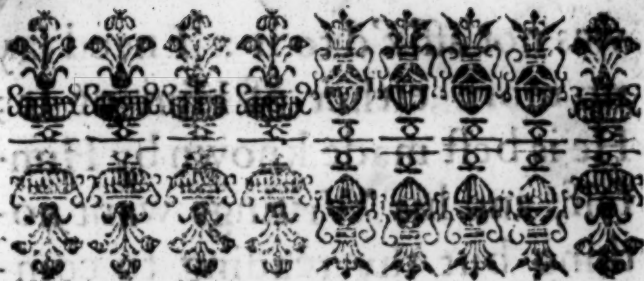
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SCIENCE.

Being a Translation out of the
Lions Philosophy
Renaldus De Cane.

London, Printed by Tho. Newman, for
John Holden at the Anchor in the
New-Burrough, 1649.



To the
Understanding **READER.**



He Great DES
CARTES
(who may just-
ly challenge
the first place
amongst the
Philosophers of this Age) is the
Author of this Discourse; which
in the Originall was so well
known, That it could be no
mans but his own, that his Name

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was not affix'd to it : I need say no more either of Him or It ; He is best made known by Himself, and his Writings want nothing but thy reading to commend them. But as those who cannot compass the Originals of *Titian* and *Van-Dyke*, are glad to adorne their Cabinets with the Copies of them ; So be pleas'd favourably to receive his Picture from my hand, copied after his own Designe : You may therein observe the lines of a well form'd Minde, The hightnings of Truth, The sweetnings and shadowings of Probabilities, The falls and depths of Falshood ; all which serve to perfect this Master-piece.

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piece. Now although my after-draught be rude and unpolished, and that perhaps I have touch'd it too boldly, The thoughts of so clear a Minde, being so extremely fine, That as the choicest words are too grosse, and fall short fully to expresse such sublime Notions ; So it cannot be, but being transvested, it must necessarily lose very much of its native Lustre : Nay, although I am conscious (notwithstanding the care I have taken neither to wrong the Authors Sense, nor offend the Readers Ear) of many escapes which I have made ; yet I so little doubt of being excused, That I am confident, my endea-

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your cannot but be gratefull to all Lovers of Learning ; for whose benefit I have Englished, and to whom I addresse this Essay , which contains a Method, by the Rules whereof we may Shape our better part, Rectifie or Reason, Form our Manners and Square our Actions, Adorn our Mindes, and making a diligent Enquiry into Nature, wee may attain to the Knowledge of the Truth, which is the most desirable union in the World.

Our Authour also invites all letterd men to his assistance in the prosecution of this Search; That for the good of Mankinde, They would practise and communicate

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municate Experiments, for the use of all those who labour for the perfection of Arts and Sciences : Every man now being obliged to the furtherance of so beneficial an Undertaking, I could not but lend my hand to open the Curtain, and discover this New Model of Philosophy ; which I now publish, neither to humour the present, nor disgust former times ; but rather that it may serve for an innocent Divertisement to those, who would rather Reform themselves, then the rest of the world ; and who, having the same seeds and grounds, and knowing That there is nothing New under the Sun ; That Novelty is but Oblivion,

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livion, and that Knowledge is but Remembrance, will study to finde out in themselves, and restore to Posterity those lost Arts, which render Antiquity so venerable ; and strive (if it be possible) to go beyond them in other things, as well as Time : Who minde not those things which are above, beyond, or without them ; but would rather limit their desires by their power, then change the Course of Nature ; Who seek the knowledge, and labour for the Conquest of themselves ; Who have Vertue enough to make their own Fortune ; And who prefer the Culture of the Minde before the Adorning of the Body ;

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dy ; To such as these I present
this Discourse (whose pardon
I beg , for having so long de-
tain'd them from so desirable a
Conversation ;) and conclude
with this Advice of the Divine
Plato :

*Cogita in te, præter Animum,
nihil esse mirabile.*

dy: I so much as that I present
this Discomfite (whole pardon
I beg, for having so long de-
tain'd them from so desirable a
Conversation;) and conclude
with this Advice of the Divine
Plato:

Cogita in te, prout Animus,
ut nihil esse mirabile.

(1)



A DISCOURSE
OF A
METHOD,

For the wel-guiding of REASON;
AND
The discovery of TRUTH in the
SCIENCES.

IF this Discourse seem too long to be read
at once, it may be divided into six parts.
In the first, are divers Considerations
touching the Sciences. In the second, the
principall Rules of that Method which
the Author hath studyed. In the third,
some of those in morality, which he hath
drawn from this Method. In the fourth,
the reasons whereby the existence of God
and of the humane Soul is proved; which
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are the grounds of his *Metaphysicks*.
In the first, the order of these *Physicall*
questions, which he hath examined, and
particularly the explication of the hearts
motion; with some other difficulties re-
lating to *Physick*; as also the difference
between our *Souls* and those of *beasts*.
In the last, what he conceives requisit to
make a further inquiry into *Nature*, then
hath hitherto been made. And what
reasons induc'd him to write.



PART. I.

Right understanding is the
most equally divided
thing in the World; for
every one beleevs him-
self so well stor'd with
it, that even those who in all other
things are the hardest to be pleas'd,
seldom desire more of it then they
have; wherein it is not likely that all
Men

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Men are deceived: But it rather witnesseth, That the faculty of right-judging and distinguishing truth from falshood (which is properly call'd, Understanding or Reason) is naturally equal in all Men. And as the diversity of our Opinions, is not, because some are more reasonable then others; but only that we direct our thoughts several ways, neither do we consider the same things. For 'tis not enough to have good faculties, but the principal is, to apply them well. The greatest Souls are as capable of the greatest Vices, as of the most eminent Vertues: And those who move but very slowly, may advance much farther, if they always follow the right way; then those who run and straggle from it.

For my part, I never presum'd that my Minde was more perfect in any thing then an ordinary Mans; nay, I have often wish'd to have had my thoughts as quick, my imagination as clear and distinct, and my memory as

large and as ready as some other Men have had. And I know no Qualities which serve more then those to the perfection of the Minde; for as for Reason or Understanding, forasmuch as it is the only thing which makes us Men, and distinguisheth us from beasts, I will beleeve it to be entire in every One, and follow herein the common opinion of the Philosophers, who say, That there is only more or less among the Accidents, and not amongst the Forms or nature of the Individuals of one species.

But I shall not stick to say, That I beleeve my self very happy, in having encountred from my youth with certain ways which have led me to considerations and Maximes, from which I have found a Method; whereby methinks, I have the means by degrees to augment my knowledg, and by little and little to raise it up to the highest pitch, whereto the meanes of my capacity, & the short course of my life can permit it to attain. For I have
already

already reaped such fruits from it, that although in the judgment I make of my self, I endeavour always rather to incline to mistrust, then to presumption. And looking on the divers actions and undertakings of all Men, with the eye of a Philosopher, there is almost none which to me seems not vain and useless. Yet I am extremely satisfied with the Progress, which (as it seems to me) I have already made in the search of Truth, and do conceive such hopes for the future, That if among the employments of Men, purely Men, there is any solidly good, and of importance, I dare beleieve it is that which I have chosen: Yet it may be that I deceive my self, and perhaps it is but a little Copper and Glasse which I take for Gold and Diamonds. I know how subject we are to mistake in those things which concern us, and how jealous we ought to be of the judgment of our friends, when it is in our favor. But I should willingly in this Discourse, trace out unto you the

ways which I have followed, and represent therein my life, as in a Picture, to the end, that every one may judge thereof; and that learning from common Fame, what mens opinions are of it, I may finde a new means of instructing my self; which I shall add to those which I customarily make use of.

Neither is it my design to teach a Method which every Man ought to follow, for the good conduct of his reason; but only to shew after what manner I have endeavoured to order mine own. Those who undertake to give precepts, ought to esteem themselves more able, than those to whom they give them, and are blame-worthy, if they fail in the least. But proposing this but as a History, or if you will have it so, but as a Fable; wherein amongst other examples, which may be imitated, we may perhaps find divers others which we may have reason to decline: I hope it will be profitable to some, without

without being hurtfull to any; and that the liberty I take will be gratefull to all.

I have been bred up to Letters from mine infancy; & because I was perswaded, that by their means a man might acquire a clear and certain knowledg of all that's usefull for this life, I was extremely desirous to learn them: But as soon as I had finish'd all the course of my Studies, at the end whereof Men are usually receiv'd amongst the rank of the learned. I wholly changed my opinion, for I found my self intangled in so many doubts and errors, that me thought I had made no other profit in seeking to instruct my self, but that I had the more discovered mine own ignorance. Yet I was in one of the most famous Schools in *Europe*; where I thought, if there were any on earth, there ought to have been learned Men. I had learnt all what others had learnt; even unsatisfied with the Sciences which were taught us, I had read over all

Books (which I could possibly procure) treating of such as are held to be the rarest and the most curious. Withall, I knew the judgment others made of me; and I perceiv'd that I was no less esteem'd then my fellow Students, although there were some amongst them that were destin'd to fill our Masters rooms. And in fine, our age seem'd to me as flourishing and as fertile of good Wits, as any of the preceding, which made me take the liberty to judg of all other men by my self, and to think, That there was no such learning in the world, as formerly I had been made beleieve.

Yet did I continue the esteem I had of those exercises which are the employments of the Schools: I knew that Languages which are there learnt, are necessary for the understanding of ancient Writers, That the quaintness of Fables awakens the Minde; That the memorable actions in History raise it up, and that being read with discretion, they help to form the judgment.

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That the reading of good books, is like the conversation with the honestest persons of the past age, who were the Authors of them, and even a studied conversation, wherein they discover to us the best only of their thoughts. That eloquence hath forces & beauties which are incomparable. That Poetry hath delicacies and sweets extremely ravishing; That the Mathematicks hath most subtile inventions, which very much conduce aswel to content the curious, as to facilitate all arts, and to lessen the labour of Men: That those writings which treat of manners contain divers instructions, and exhortations to vertue, which are very usefull. That Theology teacheth the way to heaven; That Philosophy affords us the means to speake of all things with probability, and makes her self admir'd, by the least knowing Men. That Law, Physick and other sciences bring honor and riches to those who practice them; Finally that its good to have examin'd them
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all even the falsest and the most superstitious, that we may discover their just value, and preserve our selves from their cheats.

But I thought I had spent time enough in the languages, and even also in the lecture of ancient books, their histories and their fables. For 'tis even the same thing to converse with those of former ages, as to travel. Its good to know something of the manners of severall Nations, that we may not think that all things against our *Mode* are ridiculous or unreasonable, as those are wont to do, who have seen Nothing. But when we employ too long time in travell, we at last become strangers to our own Country, and when we are too curious of those things, which we practised in former times, we commonly remain ignorant of those which are now in use. Besides, Fables make us imagine divers events possible, which are not so: And that even the most faithfull Histories, if they neither change or

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augment the value of things, to render them the more worthy to be read, at least, they always omit the basest and less remarkable circumstances; whence it is, that the rest seems not as it is; and that those who form their Manners by the examples they thence derive, are subject to fall into the extravagancies of the *Paladins* of our Romances, and to conceive designs beyond their abilities.

I highly priz'd Eloquence, and was in love with Poetry; but I esteem'd both the one and the other, rather gifts of the Minde, than the fruits of study. Those who have the strongest reasoning faculties, and who best digest their thoughts, to render them the more clear and intelligible, may always the better perswade what they propose, although they should speak but a corrupt dialect, and had never learnt Rhetorick: And those whose inventions are most pleasing, and can express them with most ornament and sweetness, will still be the best Poets,

Poets, although ignorant of the Art of Poetry.

Beyond all, I was most pleas'd with the Mathematicks, for the certainty and evidence of the reasons thereof; but I did not yet observe their true use, and thinking that it served only for Mechanick Arts; I wondred, that since the grounds thereof were so firm and solid, that nothing more sublime had been built thereon. As on the contrary, I compar'd the writings of the Ancient heathen which treated of Manners, to most proud and stately Palaces which were built only on sand and mire, they raise the vertues very high, and make them appear estimable above all the things in the world; but they do not sufficiently instruct us in the knowledg of them, and often what they call by that fair Name, is but a stupidity, or an act of pride, or of despair, or a parricide.

I reverenc'd our Theology, and pretended to heaven as much as any; But having learnt as a most certain Truth,

Truth, that the way to it, is no less open to the most ignorant, then to the most learned; and that those revealed truths which led thither, were beyond our understanding, I durst not submit to the weakness of my ratiocination. And I thought, that to undertake to examine them, and to succeed in it, requir'd some extraordinary assistance from heaven, and somewhat more then Man. I shall say nothing of Philosophy, but that seeing it hath been cultivated by the most excellent wits, which have liv'd these many ages, and that yet there is nothing which is undisputed, and by consequence, which is not doubtfull. I could not presume so far, as to hope to succeed better then others. And considering how many different opinions there may be on the same thing, maintain'd by learned Men, and yet that there never can be but one only Truth, I reputed almost all false, which had no more then probability in it.

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As for other Sciences, since they borrow their Principles from Philosophy, I judg'd that nothing which was solid could be built upon such unsound foundations ; and neither honour nor wealth were sufficient to invite me to the study of them. For (I thank God) I found not my self in a condition which obliged me to make a Trade of Letters for the relief of my fortune. And although I made it not my profession to despise glory with the Cynick ; yet did I little value that which I could not acquire but by false pretences. And lastly, for unwarrantable Studies, I thought I already too well understood what they were, to be any more subject to be deceived, either by the promises of an Alchymist, or by the predictions of an Astrologer, or by the impostures of a Magician, or by the artifice or brags of those who profess to know more then they do.

By reason whereof, as soon as my years freed me from the subjection of
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my Tutors, I wholly gave over the study of Letters, and resolving to seek no other knowledge but what I could finde in my self, or in the great book of the World, I imployed the rest of my youth in Travell, to see Courts and Armies, to frequent people of severall humors and conditions, to gain experience, to hazard my self in those encounters of fortune which should occur ; and every-where to make such a reflection on those things which presented themselves to me, that I might draw profit from them. (For (me thought) I could meet with far more truth in the discourses which every man makes touching those affairs which concern him, whose event would quickly condemn him, if he had judg'd amisse) then amongst those which letter'd Men make in their closets touching speculations, which produce no effect, and are of no consequence to them, but that perhaps they may gain so much the more vanity, as they are farther different from
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the common understanding : Forasmuch as he must have imployed the more wit and subtilty in endeavouring to render them probable. And I had always an extreme desire to learn to distinguish Truth from Falshood, that I might see cleerly into my actions, and passe this life with assurance.

Its true, that whiles I did but consider the Manners of other men, I found little or nothing wherein I might confirm my self : And I observ'd in them even as much diversity as I had found before in the opinions of the Philosophers : So that the greatest profit I could reap from them was, that seeing divers things, which although they seem to us very extravagant and ridiculous, are nevertheless commonly received and approved by other great Nations, I learn'd to beleieve nothing too firmly, of what had been onely perswaded me by example or by custom, and so by little and little I freed my self from many errors, which might eclipse our natu-

naturall light, and render us lesse able to comprehend reason. But after I had imployed some years in thus studying the Book of the World, and endeavouring to get experience, I took one day a resolution to study also within my self, and to employ all the forces of my minde in the choice of the way I was to follow: which (me thought) succeeded much better, then if I had never estranged myself from my Country, or from my Books.



PART. II.

I Was then in *Germany*, whither the Occasion of the Wars (which are not yet finished) call'd me; and as I return'd from the Emperors Coronation towards the Army, the beginning of Winter stopt me in a place, where finding no conversation to divert me

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and on the other sides having by good fortune no cares nor passions which troubled me, I stayd alone the whole day, shut up in my Stove, where I had leasure enough to entertain my self with my thoughts. Among which one of the first was that I betook my self to consider, That oft times there is not so much perfection in works compos'd of divers peeces, and made by the hands of severall masters, as in those that were wrought by one only: So we may observe that those buildings which were undertaken and finished by one onely, are commonly fairer and better ordered then those which divers have laboured to patch up, making use of old wals, which were built for other purposes: So those ancient Cities which of boroughs, became in a succession of time great Towns, are commonly so ill girt in comparison of other regular Places, which were design'd on a flatt according to the fancy of an Engeneers, and although considering their build-
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ings severally, we often find as much or more art, then in those of other places; Yet to see how they are rank'd here a great one, there a little one, and how they make the streets crooked and uneven, One would say, That it was rather Fortune, then the will of Men indued with reason, that had so disposed them. And if we consider, that there hath always been certain Officers, whose charge it was, to take care of private buildings, to make them serve for the publique ornament; We may well perceive, that it's very difficult, working on the works of others, to make things compleat. So also did I imagine, that those people who formerly had been half wilde, and civiliz'd but by degrees, made their laws but according to the incommodities which their crimes and their quarrels constrain'd them to, could not be so well pollic'd, as those who from the beginning of their association, observ'd the constitutions of some prudent Legislator.

As it is very certain, that the state of the true Religion, whose Ordinances God alone hath made, must be incomparably better regulated than all others. And to speak of humane things, I beleeve that if *Sparta* hath formerly been most flourishing, it was not by reason of the goodness of every of their laws in particular, many of them being very strange, and even contrary to good manners, but because they were invented by one only, They all tended to One End. And so I thought the sciences in Books, at least those whose reasons are but probable, and which have no demonstrations, having been compos'd of, and by little and little enlarg'd with, the opinions of divers persons, come not so near the Truth, as those simple reasonings which an understanding Man can naturally make, touching those things which occur. And I thought besides also, That since we have all been children, before we were Men; and that we

must

must have been a long time govern'd by our appetites, and by our Tutors, who were often contrary to one another, and neither of which alwayes counsel'd us for the best; It's almost impossible that our judgment could be so clear or so solid, as it might have been; had we had the intire use of our reason from the time of our birth, and been always guided by it alone.

Its true, we doe not see the houses of a whole Town pull'd down purposely to re-build them of another fashion; and to make the streets the fairer; But we often see, that divers pull their own down to set them up again, and that even sometimes they are forc'd thereunto, when they are in danger to fall of themselves, and that their foundations are not sure. By which example I perswaded myself, that there was no sense for a particular person, to design the Reformation of a State, changing all from the very foundations, and subverting

all to redress it again: Nor even also to reform the bodies of Sciences, or the Orders already established in the Schools for teaching them. But as for all the Opinions which I had till then receiv'd into my beleef, I could not doe better then to undertake to expunge them once for all, that afterwards I might place in their stead, either others which were better, or the same again, as soon as I should have adjusted them to the rule of reason. And I did confidently beleeeve, that by that means I should succeed much better in the conduct of my life, then if I built but on old foundations, and only relyed on those principles, which I suffer'd my self to be perswaded to in my youth, without ever examining the Truth of them. For although I observ'd herein divers difficulties, yet were they not without cure, nor comparable to those which occur in the reformation of the least things belonging to the publick: these great bodies are too unweldy to be rais'd, being
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cast down, or to be held up when they are shaken, neither can their falls be but the heaviest.

As for their imperfections, if they have any, as the only diversity which is amongst them, is sufficient to assure us that many have. Custome hath (without doubt) much sweetned them, and even it hath made others wave, or insensibly correct a many, whereto we could not so well by prudence have given a remedy. And in fine, They are alwayes more supportable, then their change can be, Even, as the great Roads, which winding by little and little betwixt mountains, become so plain and commodious, with being often frequented, that it's much better to follow them, then to undertake to goe in a strait line by climbing over the rocks, and descending to the bottom of precipices. Wherefore I can by no means approve of those turbulent and unquiet humors, who being neither call'd by birth or fortune to the

managing of publique affairs, yet are
 alwayes forming in *Idea*, some new
 Reformation. And did I think there
 were the least thing in this Discourse,
 which might render me suspected of
 that folly, I should be extremely sorry
 to suffer it to be published; I never
 had any designe which intended far-
 ther then to reform my own thoughts
 and to build on a foundation which
 was wholly mine. But though I pre-
 sent you here with a Modell of my
 work, because it hath sufficiently
 pleased me; I would not therefore
 counsell any one to imitate it. Those
 whom God hath better endued with
 his graces, may perhaps have more
 elevated designes; but I fear me, lest
 already this be too bold for some.
 The resolution only of quitting all
 those opinions which we have for-
 merly receiv'd into our belief, is not
 an example to be followed by every
 One; and the world is almost com-
 pos'd but of two sorts of Men, to
 whom it's no wayes convenient, to
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wit, of those, who beleiving themselves more able then they are, cannot with-hold themselves from precipitating their judgments, nor have patience enough to steer all their thoughts in an orderly course. Whence it happens, that if they should once take the liberty to doubt of those principles which they have already received, and to stray from the common road, they could never keep the path which leads strait forwards, and so, would straggle all their lives. And of such who having reason and modesty enough to judg that they are less able to distinguish truth from falshood then others, from whom they may receive instruction, ought much rather to be content to follow other Mens opinions, rather then to seek after better themselves.

And for my part, I had undoubtedly been of the number of those latter, had I never had but one Master, or had I not known the disputes which
have

have alwayes hapned amongst the most learned. For having learnt from the very School, That one can imagin nothing so strange or incredible, which had not been said by some one of the Philosophers; And having since observ'd in my travails, That all those whose opinions are contrary to ours, are not therefore barbarous or savage, but that many use as much or more reason then we; and having consider'd how much one Man with his own understanding, bred up from his childhood among the French or the Dutch, becomes different from what he would be, had he alwayes liv'd amongst the *Chineses*, or the *Canibals*: And how even in the fashion of our Clothes, the same thing which pleas'd ten years since, and which perhaps wil please ten years hence, seems now to us ridiculous and extravagant. So that it's much more Custome and Example which perswades us, then any assured knowledg; and notwithstanding that plurality of voices is a
proof

proof of no validity, in those truths which are hard to be discovered; for that it's much more likely for one man alone to have met with them, then a whole Nation; I could choose no Man whose opinion was to be preferr'd before anothers: And I found my self even constrain'd to undertake the conduct of my self.

But as a man that walks alone, and in the dark, I resolv'd to goe so softly, and use so much circumspection in all things, that though I advanc'd little, I would yet save my self from falling. Neither would I begin quite to reject, some opinions, which formerly had crept into my belief, without the consent of my reason, before I had employed time enough to form the project of the work I undertook, and to seek the true Method to bring me to the knowledg of all those things, of which my understanding was capable.

I had a little studyed, being young, of the parts of Philosophy, Logick,
and

and of the Mathematicks, the Analysis of the Geometricians, and *Algebra*: Three arts or sciences which seem'd to contribute somewhat conducing to my designe: But examining them, I observ'd, That as for Logick, its Syllogisms, and the greatest part of its other Rules, serve rather to expound to another the things they know, or even as *Lullies* art, to speak with judgment of the things we are ignorant of, then to learn them. And although in effect it contain divers most true and good precepts, yet there are so many others mixed amongst them, either hurtfull or superfluous, That it's even as difficult to extract them, as 'tis to draw a *Diana* or a *Mercury* out of a lump of Marble, which is not yet rough-hewn; as for the Analysis of the Ancients, and the *Algebra* of the Moderns; besides that, they extend only to matters very abstract, and which seem to be of no use; The first being alwayes so tyed to the consideration of figures, That it cannot exercise

cise the understanding, without very much tiring the imagination. And in the latter they have so subjected themselves to certain Rules and cyphers, that they have made a confus'd and obscure art which perplexeth the minde, in stead of a Science to instruct it. For this reason, I thought I ought to seek some other Method, which comprehending the advantages of these, they might be exempt from their defects. And as the multitude of Laws often furnisheth excuses for vice; so a State is farr better polic'd, when having but a few, they are very strictly observ'd therein: So, instead of the great many precepts whereof Logick is compos'd, I thought these four following would be sufficient for me, if I took but a firm and constant resolution not once to fail in the observation of them.

The first was, never to receive any thing for true, but what I evidently knew to be so; that's to say, Carefully to avoid Precipitation and Prevention,

tion, and to admit nothing more into my judgment, but what should so clearly and distinctly present it self to my minde, that I could have no reason to doubt of it.

The second, to divide every One of these difficulties, which I was to examine into as many parcels as could be, and, as was requisite the better to resolve them.

The third, to lead my thoughts in order, beginning by the most simple objects, and the easiest to be known; to rise by little and little, as by steps, even to the knowledg of the most mixt; and even supposing an Order among those which naturally doe not precede one the other.

And the last, to make every where such exact calculations, and such generall reviews, That I might be confident to have omitted Nothing.

Those long chains of reasons, (though simple and easie) which the Geometricians commonly use to lead us to their most difficult demon-

monstrations, gave me occasion to imagine, That all things which may fall under the knowledg of Men, follow one the other in the same manner, and so we doe only abstain from receiving any one for true, which is not so, and observe alwayes the right order of deducing them one from the other, there can be none so remote, to which at last we shall not attain, nor so hid, which we shall not discover. Neither was I much troubled to seek by which it behooved me to begin, for I already knew, that it was by the most simple, and the easiest to be discern'd. But considering, that amongst all those who formerly have sought the Truth in Learning, none but the Mathematicians only could finde any demonstrations, that's to say, any certain and evident reasons. I doubted not, but that it was by the same that they have examin'd; although I did hope for no other profit, but only that they would accustome my Minde to nourish it self with Truths,

Truths, and not content it self with false Reasons. But for all this, I never intended to endeavour to learn all those particular Sciences which we commonly call'd Mathematicall: And perceiving, that although their objects were different, yet did they nevertheless agree altogether, in that they consider no other thing, but the divers relations or proportions which are found therein; I thought it therefore better to examine those proportions in generall, and without supposing them but in those subjects, which might the more easily serve to bring me to the knowledg of them. But withall, without any wayes limiting them, That I might afterwards the better fit them to all others whereto they might be applyed. Having also observ'd, That to know them, it would be sometimes needfull for me to consider every one in particular, or sometimes only to restrain them, or comprehend many together; I thought, that to consider them the better

better in particular I ought to suppose them in lines, for as much as I find nothing more simple, nor which I could more distinctly represent to my imagination, and to my senses ; But to hold or comprehend many in one, I was oblig'd to explain them by certain Cyphers the shortest I possibly could, and that I should thereby borrow the best of the Geometrical Analysis, and of Algebra, & so correct all the defects of the one by the other.

As in effect I dare say, That the exact observation of those few precepts I had chosen, gave me such a facility to resolve all the questions whereto these two sciences extend ; That in two or three months space which I employed in the examination of them, having begun by the most simple and most generall, and every Truth which I found being a rule which afterwards served me to discover others ; I did not only compass divers truths which I had formerly judged most difficult, But me thought also that towards the end I could de-

D

termin

termin even in those which I was ignorant of, by what means and how far it was possible to resolve them. Wherein perhaps I shall not appear to be very vain if you consider, That there being but one truth of every thing, who ever finds it, knows as much of it as one can know; And that for example a child instructed in Arithmatick having made an addition according to his rules, may be sure to have found, touching the sum he examined, all what the wit of man could finde out. In a word the method which teacheth to follow a right order, and exactly to enumerate all the circumstances of what we seek, contains, whatsoever ascertains the rules of Arithmatick.

But that which pleas'd me most in this Method was the assurance I had, wholly to use my reason, if not perfectly, at least as much as it was in my power; Besides this, I perceived in the practice of it, my minde by little and little accusom'd it self to conceive its objects more clearly and distinctly; and having not subjected it
to

to any particular matter, I promised my self to apply it also as profitable to the difficulties, of other sciences as I had to Algebra : Not that I therefore durst at first undertake to examine all which might present themselves, for that were contrary to the order it prescribes. But having observ'd that all their principles were to be borrowed from Philosophy, in which I had yet found none that were certain, I thought it were needfull for me in the first place to endeavor to establish some, and that this being the most important thing in the world, wherein precipitation and prevention were the most to be feared, I should not undertake to performe it, till I had attain'd to a riper Age then XXII. which was then mine. Before I had formerly employed a long time in preparing my self thereunto, aswel in rooting out of my minde all the ill opinions I had before that time received, as in getting a stock of experience to serve afterwards for the subject of my reasonings, and in exercising my self

always in the Method I had prescribed.
That I might the more and more
confine my self therein.



PART. III.

BUt as it is not enough to pull down
the house where we dwell, before
we begin to re-edify it, and to make
provision of materials and architects,
or performe that office our selves; nor
yet to have carefully laid the design of
it; but we must also have provided our
selves of some other place of abode
during the time of the rebuilding :
So that I might not remain irresolute
in my actions, while reason would ob-
lige me to be so in my judgments, and
that I might continue to live the most
happily I could, I form'd for my own
use in the interim a Moral, which con-
sisted but of three or four Maximes,
which I shall communicate unto you.

The

The first was to obey the lawes and customes of my Country, constantly adhering to that Religion wherein by the grace of God I had from mine infancy bin bred. And in all other things behaving my self according to the most moderate opinions and those which were farthest from excesse, which were commonly received in practice by the most judicious Men, amongst whom I was to live : For beginning from that very time, to reckon mine own for nothing, because I could bring them all to the test, I was confident I could not do better then follow those of the deepest sense ; and although perhaps there are as understanding men amongst the Persians or Chineses as amongst us, yet I thought it was more fit to regulate my self by those with whom I was to live, and that I might truly know what their opinions were, I was rather to observe what they practic'd, then what they taught. Not only by reason of the corruption of our manners, there are but few
 who

who will say, all they beleeve, but also because divers are themselves ignorant of it; for the act of the thought by which we beleeve a thing, being different from that whereby we know that we believe it, the one often is without the other. And amongst divers opinions equally receiv'd, I made choise of the most moderate only, as well because they are always the most fit for practice, and probably the best, all excess being commonly ill; As also that I might less err from the right way, if I should perhaps miss it, then if having chosen one of the extremes, it might prove to be the other, which I should have followed. And particularly I plac'd amongst extremities, all those promises by which we somewhat restrain our liberty. Not that I disapproved the laws, which to cure the inconstancy of weak minds, permit us when we have any good design, or else for the preservation of Commerce, one that is but indifferent, to make vows or contracts, which oblige us

us to persevere in them: But because I saw nothing in the world remain always in the same state; and for mine own particular, promised my self to perfect more and more my judgment, and not to impair it, I should have thought my self guilty of a great fault against right understanding, if because I then approved any thing, I were also afterwards oblig'd to take it for good, when perhaps it ceased to be so, or that I had ceased to esteem it so.

My second Maxime was, To be the most constant and resolute in my actions that I could; and to follow with no less perseverance the most doubtful opinions, when I had once determined them, then if they had been the most certain. Imitating herein Travelers, who having lost their way in a Forrest, ought not to wander, turning now this way, and then that, and less to abide in one place; but stil advance straight forwards, towards one way, and not to change on slight occasions, although perhaps at first Chance only

mov'd them to determine that choice: For by that means, if they do not go directly whither they desire, they will at least arrive somewhere where they will probably be better then in the midst of a Forrest. So the actions of this life admitting often of no delay, its a most certain Truth, That when it is not in our power to discern the truest opinions, we are to follow the most probable : Yea, although we finde no more probability in the one then in the other, we yet ought to determine some way, considering them afterwards no more as doubtful in what they relate to practice ; but as most true and certain ; forasmuch as the reason was so, which made us determine it. And this was sufficient for that time to free me from all the remorse and repentance which useth to perplex the consciences of those weak and staggering minds, which incessantly suffer themselves to passe to the practice of those things as good, which they afterwards judge evill.

My

My third Maxime was, To endeavour
 always rather to conquer my self then
 Fortune; and to change my desires,
 rather then the order of the world :
 and generally to accustome my self to
 beleieve, That there is nothing wholly
 in our power but our thoughts ; so
 that after we have done our best, tou-
 ching things which are without us, all
 whats wanting of success in respect of
 us is absolutely impossible. And this a-
 lone seem'd sufficient to hinder me from
 desiring any thing which I could not
 acquire, and so to render me content.
 For our will naturally moving us to
 desire nothing, but those things which
 our understanding presents in some
 manner as possible , certain it is, that
 if we consider all the good which is
 without us, as equally distant from
 our power, we should have no more
 regret for the want of those which
 seem due to our births, when without
 any fault of ours we shall be deprived
 of them, then we have in wanting
 the possessions of the Kingdoms of
China

China or Mexico. And making (as we say) vertue of necessity, we should no more desire to be in health being sick, or free being in prison, then we now do, to have bodies of as incorruptible a matter as diamonds, or wings to fly like birds. But I confess, that a long exercise, and an often reiterated meditation, is necessary to accustom us to look on all things with that byass: And I beleieve, in this principally consists, the secret of those Philosophers who formerly could snatch themselves from the Empire of Fortune, and in spite of pains and poverty, dispute felicity with their Gods. for employing themselves incessantly in considering the bounds which Nature had prescribed them, they so perfectly perswaded themselves, That nothing was in their power but their thoughts, that, that onely was enough to hinder them from having any affection for other things. And they disposed so absolutely of them, that therein they had some reason to esteem themselves
more

more rich and powerfull, more free and happy then any other men ; who wanting this *Philosophy*, though they were never so much favoured by Nature and Fortune, could never dispose of all things so well as they desired.

Lastly, To conclude these Morals, I thought fit to make a review of mens severall imployments in this life, that I might endeavour to make choice of the best, and without prejudice to other mens, I thought I could not do better then to continue in the same wherein I was, that is, to imploy all my life in cultivating my Reason, and advancing my self, as far as I could in the knowledge of Truth, following the Method I had prescribed my self. I was sensible of such extreme contentment since I began to use this Method, that I thought none could in this life be capable of any more sweet and innocent : and daily discovering by means thereof, some Truths which seemed to me of importance, and commonly such as other men

men were ignorant of, the satisfaction I thereby received did so possesse my minde, as if all things else concern'd me not. Besides, that the three preceding Maximes were grounded only on the designe I had, to continue the instruction of my self. For God having given to every one of us a light to discern truth from falshood, I could not beleieve I ought to content my self one moment with the opinions of others, unlesse I had proposed to my self in due time to imploy my judgment in the examination of them. Neither could I have exempted my self from scruple in following them, had I not hoped to lose no occasion of finding out better, if there were any.

But to conclude, I could not have bounded my desires, nor have been content, had I not followed a way, whereby thinking my self assured to acquire all the knowledge I could be capable of: I thought I might by the same means attain to all that was truly

ly good, which should ever be within my power; forasmuch as our Will inclining it self to follow, or fly nothing but what our Understanding proposeth good or ill, to judge well is sufficient to do well, and to judge the best we can, to do also what's best; to wit, to acquire all vertues, and with them all acquirable goods: and whosoever is sure of that, he can never fail of being content.

After I had thus confirmed my self with these Maximes, and laid them up with the Articles of Faith, which always had the first place in my Belief, I judg'd that I might freely undertake to expell all the rest of my opinions. And forasmuch as I did hope to bring it the better to passe by conversing with men, then by staying any longer in my stove, where I had had all these thoughts: before the Winter was fully ended, I returned to my travels; and in all the nine following yeers I did nothing but rowl here and there about the world, endeavouring

deavouring rather to be a spectator, then an actor in all those Comedies which were acted therein : and reflecting particularly on every subject which might render it suspected, or afford any occasion of mistake. In the mean time I rooted out of my minde all those errors which formerly had crept in. Not that I therein imitated the Scepticks, who doubt onely to the end they may doubt, and affect to be always unresolved : For on the contrary, all my designe tended onely to fix my self, and to avoid quick-mires and sands, that I might finde rock and clay : which (me thought) succeeded well enough ; forasmuch as, seeking to discover the falshood or uncertainty of those propositions I examined, (not by weak conjectures, but by clear and certain ratiocinations) I met with none so doubtfull, but I thence drew some conclusion certain enough, were it but onely this, That it contained nothing that was certain. And as in pulling down an old house, commonly

ly those materials are reserved which may serve to build a new one; so in destroying all those my opinions which I judg'd ill grounded, I made divers observations, and got severall experiences which served me since to establish more certain ones. And besides I continued to exercise my self in the Method I had prescibed.

For I was not only carefull to direct all my thoughts in generall according to its rules, but I from time to time reserv'd some houres, which I particularly employd to practice it in difficulties belonging to the Mathematicks, loosening from all the principles of other Sciences, which I found not stable enough, as you may see I have done in divers explain'd in my other following discourses. And thus not living in appearance otherwise then those who having no other business then to lead a sweet and innocent life, study to separate pleasures from vices, and use honest recreations to enjoy their ease without wearinesse; I did not forbear
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to pursue my design, and advance in the knowledg of truth, perhaps more, then if I had done nothing but read books or frequent learned men.

Yet these nine years were vanished, before I had engaged my self in those difficulties which use to be disputed amongst the learned; or begun to seek the grounds of any more certain Philosophy then the Vulgar: And the example of divers excellent Men, who formerly having had the same designe, seem'd not to me to have succeeded therein, made me imagine so much difficulty, that I had not perhaps dar'd so quickly to have undertaken it, had I not perceiv'd that some already had given it out that I had already accomplished it. I know not whereupon they grounded this opinion, and if I have contributed any thing thereto by my discourse, it must have been by confessing more ingeniously what I was ignorant of, then those are wont to do who have a little studyed, and perhaps also by communicating those reasons, I
had

had to doubt of many things which others esteem'd most eminent, rather than that I bragg'd of any learning. But having integrity enough, not to desire to be taken for what I was not, I thought that I ought to endeavour by all means to render my self worthy of the reputation which was given me. And 'tis now eight years since this desire made me resolve to estrange my self from all places where I might have any acquaintance, and so retire my self hither in a Country where the long continuance of the warre hath established such orders, that the Armies which are intertain'd there, seem to serve onely to make the inhabitants enjoy the fruits of peace with so much the more security, and where amongst the croud of a great people more active and solicitous for their own affaires, then curious of other mens, not wanting any of those necessities which are in the most frequented Towns, I could live as solitary and retired as in the most remote deserts.



PART. III.

I Know not whether I ought to entertain you with the first Meditations which I had there, for they are so Metaphysicall and so little common, that perhaps they will not be relished by all men: And yet that you may judge whether the foundations I have laid are firm enough, I find my self in a manner oblig'd to discourse them; I had long since observed that as for manners, it was sometimes necessary to follow those opinions which we know to be very uncertain, as much as if they were indubitable, as is before said: But because that then I desired onely to intend the search of truth, I thought I ought to doe the contrary, and reject as absolutely false all wherein I could imagine the least doubt, to the end I might see if afterwards any thing

might

might remain in my belief, not at all subject to doubt. Thus because our senses sometimes deceive us, I would suppose that there was nothing which was such as they represented it to us. And because there are men who mistake themselves in reasoning, even in the most simple matters of Geometry, and make therein Paralogismes, judging that I was as subject to fail as any other Man, I rejected as false all those reasons, which I had before taken for Demonstrations. And considering, that the same thoughts which we have waking, may also happen to us sleeping, when as not any one of them is true. I resolv'd to saign, that all those things which ever entred into my Minde, were no more true, then the illusions of my dreams. But presently after I observ'd, that whilst I would think that all was false, it must necessarily follow, that I who thought it, must be something. And perceiving that this Truth, *I think*, therefore, *I am*, was so firm and certain,

tain, that all the most extravagant suppositions of the Scepticks was not able to shake it, I judg'd that I might receive it without scruple for the first principle of the Philosophy I sought.

Examining carefully afterwards what I was; and seeing that I could suppose that I had no *body*, and that there was no *World*, nor any *place* where I was: but for all this, I could not feign that I *was not*, and that even contrary thereto, thinking to doubt the truth of other things, it most evidently and certainly followed, That *I was*: whereas, if I had ceas'd to *think*, although all the rest of what-ever I had imagined were true, I had no reason to beleieve that *I had been*. I knew then that I was a substance, whose whole essence or nature is, but to *think*, and who to *be*, hath need of no place, nor depends on any materiall thing. So that this *Me*, to wit, my Soul, by which I am what I am, is wholly distinct from the Body, and
more

more easie to be known then *it* ; and although *that* were not, it would not therefore cease to be what it is.

After this I considered in generall what is requisite in a Proposition to make it true and certain : for since I had found out one which I knew to be so, I thought I ought also to consider wherein that certainty consisted : and having observed, That there is nothing at all in this, *I think*, therefore *I am*, which assures me that I speak the truth, except this, that I see most cleerly, That *to think*, one must have a *being* ; I judg'd that I might take for a generall rule, That those things which we conceive cleerly and distinctly, are all true ; and that the onely difficulty is punctually to observe what those are which we distinctly conceive.

In pursuance whereof, reflecting on what I doubted, and that consequently my *being* was not perfect ; for I clearly perceived, that it was a greater perfection to know, then to doubt,

I advised in my self to seek from whence I had learnt to think on something which was more perfect then I; and I knew evidently that it must be of some nature which was indeed more perfect. As for what concerns the thoughts I had of divers other things without my self, as of heaven, earth, light, heat, and a thousand more, I was not so much troubled to know whence they came, for that I observed nothing in them which seemed to render them superiour to me; I might beleeve, that if they were true, they were dependancies from my nature, as far forth as it had any perfection; and if they were not, I made no account of them; that is to say, That they were in me, because I had something deficient. But it could not be the same with the *Idea* of a being more perfect then mine: For to esteem of it as of nothing, was a thing manifestly impossible. And because there is no lesse repugnancy that the more perfect should succeed from and depend

pend upon the less perfect, then for something to proceed from nothing, I could no more hold it from my self : So as it followed, that it must have bin put into me by a Nature which was truly more perfect then I, and even which had in it all the perfections whereof I could have an *Idea*; to wit, (to explain my self in one word) God. Whereto I added, that since I knew some perfections which I had not, I was not the onely *Being* which had an existence, (I shall, under favour, use here freely the terms of the Schools) but that of necessity there must be some other more perfect whereon I depended, and from whom I had gotten all what I had : For had I been alone, and depending upon no other thing, so that I had had of my self all that little which I participated of a perfect Being, I might have had by the same reason from my self, all the remainder which I knew I wanted, and so have been my self infinite, eternall, immutable, all-knowing, al-

mighty; and lastly, have had all those perfections which I have observed to be in God. For according to the way of reasoning I have now followed, to know the nature of God, as far as mine own was capable of it, I was onely to consider of those things of which I found an *Idea* in me, whether the possessing of them were a perfection or no; and I was sure, that any of those which had any imperfections were not in him, but that all others were. I saw that doubtfulness, inconstancy, sorrow and the like, could not be in him, seeing I could my self have with'd to have been exempted from them. Besides this, I had the *Ideas* of divers sensible and corporeall things; for although I supposed that I doted, and that all that I saw or imagined was false; yet could I not deny but that these *Ideas* were truly in my thoughts. But because I had most evidently known in my self, That the understanding Nature is distinct from the corporeall, considering that all composition

position witnesseth a dependency, and that dependency is manifestly a defect, I thence judged that it could not be a perfection in God to be composed of those two Natures; and that by consequence he was not so composed. But that if there were any Bodies in the world, or els any intelligences, or other Natures which were not wholly perfect, their being must depend from his power in such a manner, that they could not subsist one moment without him.

Thence I went in search of other Truths; and having proposed *Geometry* for my object, which I conceived as a continued Body, or a space indefinitely spread in length, bredth, height or depth, divisible into divers parts, which might take severall figures and bignesses, and be moved and transposed every way. For the Geometricians suppose all this in their object. I past through some of their most simple demonstrations; and having observed that this great certain-

tie,

tie, which all the world grants them, is founded only on this, that men evidently conceived them, following the rule I already mentioned. I observed also that there was nothing at all in them which ascertain'd me of the existence of their object. As for example, I well perceive, that supposing a Triangle, three angles necessarily must be equal to two right ones: but yet nevertheless I saw nothing which assured me that there was a Triangle in the world. Whereas returning to examine the *Idea* which I had of a perfect Being, I found its existence comprised in it, in the same manner as it was comprised in that of a Triangle, where the three angles are equal to two right ones; or in that of a sphere, where all the parts are equally distant from the center. Or even yet more evidently, and that by consequence, it is at least as certain that God, who is that perfect Being, is, or exists, as any demonstration in Geometry can be.

But

But that which makes many persuade themselves that there is difficulty in knowing it, as also to know what their Soul is, 'tis that they never raise their thoughts beyond sensible things, and that they are so accustomed to consider nothing but by imagination, which is a particular manner of thinking on materiall things, that whatsoever is not imaginable seems to them not intelligible. Which is manifest enough from this, that even the Philosophers hold for a Maxime in the Schools, That there is nothing in the understanding which was not first in the sense; where notwithstanding its certain, that the *Ideas* of God and of the Soul never were. And (me thinks) those who use their imagination to comprehend them, are just as those, who to hear sounds, or smell odours, would make use of their eyes; save that there is yet this difference, That the sense of seeing assures us no lesse of the truth of its objects, then those of smelling or hearing do :
 whereas

whereas neither our imagination, nor our senses, can ever assure us of any thing, if our understanding intervenes not.

To be short, if there remain any who are not enough perswaded of the existence of God, and of their soul, from the reasons I have produc'd, I would have them know, that all other things, whereof perhaps they think themselves more assured, as to have a body, and that there are Stars, and an earth, and the like, are less certain. For although we had such a morall assurance of these things, that without being extravagant we could not doubt of them. However, unless we be unreasonable when a metaphysicall certainty is in question, we cannot deny but we have cause enough not to be wholly confirm'd in them, when we consider that in the same manner we may imagine being asleep, we have other bodies, and that we see other Stars, and another earth, though there be no such thing. For how doe
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we know that those thoughts which we have in our dreams, are rather false than the others, seeing often they are no less lively and significant, and let the ablest men study it as long as they please, I beleeeve they can give no sufficient reason to remove this doubt, unless they presuppose the existence of God. For first of all, that which I even now took for a rule, to wit, that those things which were most clearly and distinctly conceived, are all true, is certain, only by reason, that God is or exists, and that he is a perfect being, and that all which we have comes from him. Whence it follows, that our Idea's or notions, being reall things, and which come from God in all wherein they are clear and distinct, cannot therein be but true. So that if we have very often any which contain falshood, they cannot be but of such things which are somewhat confus'd and obscure, because that therein they signifie nothing to us, that's to say, that they are thus confus'd in us only, because

cause we are not wholly perfect. And it's evident that there is no less contrariety that falshood and imperfection should proceed from God, as such, then there is in this, that truth and falshood proceed from nothing. But if we know not that whatsoever was true and real in us comes from a perfect and infinite being, how clear and distinct soever our Idea's were, we should have no reason to assure us, that they had the perfection to be true.

Now after that the knowledge of God, and of the Soul hath rendred us thus certain of this rule, it's easie to know; that the extravaganceys which we imagin in our sleep, ought no way to make us doubt of the truth of those thoughts which we have being awake: For if it should happen, that even sleeping we should have a very distinct Idea; as for example, A Geometritian should invent some new demonstration, his sleeping would not hinder it to be true. And for the
 most

most ordinary error of our dreames, which consists in that they represent unto us severall objects in the same manner as our exterior senses doe, it matters not though it give us occasion to mistrust the truth of those Ideas, because that they may also often enough cozen us when we doe not sleep; As when to those who have the Jaundies, all they see seems yellow; or, as the Stars or other bodies at a distance, appear much less then they are. For in fine, whether we sleep or wake, we ought never to suffer our selves to be perswaded but by the evidence of our Reason; I say, (which is observable) Of our Reason, and not of our imagination, or of our senses. As although we see the Sun most clearly, we are not therefore to judge him to be of the bigness we see him of; and we may well distinctly imagine the head of a Lion, set on the body of a Goat, but therefore we ought not to conclude that there is a *Chimera* in the world. For reason doth not dictate
to

to us, that what we see or imagine so, is true : But it dictates, that all our Idea's or notions ought to have some grounds of truth; For it were not possible, that God who is all perfect, and all truth, should have put them in us without that : And because that our reasonings are never so evident, nor so entire while we sleep, as when we wake, although sometimes our imaginations be then as much or more lively and express. It also dictates to us, that our thoughts, seeing they cannot be all true by reason that we are not wholly perfect ; what they have of truth, ought infallibly to occur in those which we have being awake, rather then in our dreams.

PART.



P A R T. V.

I Should be glad to pursue this Discourse, and shew you the whole Series of the following Truths, which I have drawn from the former: But because for this purpose, it were now necessary for me to treat of severall questions, which are controverted by the learned, with whom I have no desire to imbroil my self, I beleieve it better for me to abstain from it; and so in generall onely to discover what they are, that I may leave the wisest to judge whether it were profitable to inform the publick more particularly of them. I alwayes remained constant to my resolution, to suppose no other Principle but that which I now made use of, for the demonstration of the Existence of God, and of
F the

the Soul ; and to receive nothing for true, which did not seem to me more clear and more certain then the demonstrations of Geometry had formerly done. And yet I dare say, that I have not onely found out the means to satisfie my self, in a short time, concerning all the principall difficulties which are usually treated in Philosophy. But that also I have observed certain Laws which God hath so established in Nature, and of which he hath imprinted such notions in our Souls, that when we shall have made sufficient reflections upon them, we cannot doubt but that they are exactly observed in whatsoever either is, or is done in the World. Then considering the connexion of these Laws, me thinks, I have discovered divers Truths, more usefull and important, then whatever I learn'd before, or ever hop'd to learn.

But because I have endeavoured to lay open the principall of them in a Treatise, which some considerations hinder

hinder me from publishing; *I* can no way better make them known, then by relating summarily what it contains.

I had a designe to comprehend all what *I* thought *I* knew, before *I* would write it, touching the nature of material things. But even as Painters, not being able equally well to represent upon a *flat* all the severall facies of a solid body, chuse the principall of them, which they place towards the light; and shadowing the others, make them appear no more then they do to our sight: So, fearing lest *I* should not bring into this Discourse all which was in my thoughts, *I* onely undertook to set forth at large my conceptions touching the light; and upon that occasion to add somewhat of the Sun, and of the fix'd Stars, by reason that it proceeds almost all from thence; of the Heavens, because they transmit it; of the Planets, of the Comets, and of the Earth, because they cause it to reflect;

and in particular, of all Bodies which are on the earth, whether for that they are either coloured, or transparent, or luminous; and last of all, of Man, because he is the Spectator thereof. As also, in some manner to shadow out all these things, and that *I* might the more freely speak what *I* judg'd, without being obliged to follow, or to refute the opinions which are received amongst the Learned, *I* resolved to leave all this world here to their disputes, and to speak onely of what would happen in a new one, if God now created some where in those imaginary spaces matter enough to compose it, and that he diversly and without order agitated the severall parts of this matter, so as to compose a Chaos of it as confused as the Poets could feign one: and that afterwards he did nothing but lend his ordinary concurrence to Nature, and leave her to work according to the Laws he hath established.

Thus first of all *I* described this Matter,

ter, and endeavoured to represent it such, that me thinks there is nothing in the world more clear, or more intelligible, except what was before-said of God, and of the Soul. For even I expressly supposed that there was in it none of those forms and qualities which are disputed in the Schools; nor generally any thing but that the knowledge thereof was so naturall to our understandings, that we could not even feigne to be ignorant of it. Besides, I made known what the Laws of Nature were; and without grounding my reasons on any other principles, but on the infinite perfections of God, I did endeavour to demonstrate all those which might be questioned, and to make them appear to be such, that although God had created divers worlds, there could have been none where they were not observed. Afterwards I shewed how the greater part of the Matter of this *Chaos* ought, according to those Laws, to dispose and order it self in a cer-

tain manner, which would make it like our Heavens : And how some of these parts were to compose an Earth, and some Planets and Commets, some others a Sun and fix'd Starrs. And here enlarging my self on the subject of Light, *I* at length explain'd what that light was, which was to be in the Sun and Stars ; and thence how it travers'd in an instant the immense spaces of the Heavens, and how it reflected it self from Planets and Commets towards the Earth. *I* added also divers things touching the substance, situation, the motions, and all the several qualities of these heavens and these stars : So that *I* thought *I* had said enough to make known, That there is nothing remarkable in those of this world, which ought not, or at least could not appear altogether like to these of that world which *I* described.

Thence *I* came to speak particularly of the Earth ; how, although *I* had expressly supposed, that God had placed

ced no weight in the Matter where-
 of it was compos'd; yet all its parts
 exactly tended towards its center:
 How that there being water and air
 upon its superficies, the disposition of
 the Heavens, and of the Starrs, and
 chiefly of the Moon, ought to cause
 a flood and an ebb, which in all cir-
 cumstances was like to that which we
 observe in our Seas; And besides, a
 certain course aswel of the water, as
 of the air, from East to West, as is al-
 so observed between the Tropicks:
 How the Mountains, the Seas, the
 Springs and Rivers might naturally
 be form'd therein, and Metals run in
 the mines, and Plants grow in the
 Fields, and generally all bodies be
 therein engendered which are call'd
 mixt or compos'd..

And amongst other things, because
 that next the Stars, I know nothing
 in the world but Fire, which produ-
 ceth light, I studied to make all clear-
 ly understood which belongs to its
 nature; how it's made, how it's fed,

how sometimes it hath heat onely without light, and sometimes onely light without heat ; how it can introduce several colours into several bodies, and divers other qualities ; how it dissolves some, and hardens others ; how it can consume almost all, or convert them into ashes and smoak : and last of all, how of those ashes, by the only violence of its action, it forms glass. For this transmutation of ashes into glass, seeming to me to be as admirable as any other operation in Nature, I particularly took pleasure to describe it.

Yet would I not inferre from all these things, that this World was created after the manner I had proposed. For it is more propable that God made it such as it was to be, from the beginning. But it's certain, and 'tis an opinion commonly received amongst the Divines, That the action whereby he now preserveth it, is the same with that by which he created it. So that, although at the beginning

ning he had given it no other form but that of a Chaos (provided, that having established the Laws of Nature, he had afforded his concurrence to it, to work as it used to do) we may believe (without doing wrong to the miracle of the Creation) that by that alone all things which are purely material might in time have rendred themselves such as we now see them : and their nature is far easier to conceive, when by little and little we see them brought forth so, then when we consider them quite form'd all at once.

From the description of inanimate Bodies and Plants, I pass'd to that of Animals, and particularly to that of Men. But because I had not yet knowledge enough to speak of them in the same stile as of the others ; to wit, in demonstrating effects by their causes, and shewing from what seeds, and in what manner Nature ought to produce them ; I contented my self, to suppose, That God form'd the body

dy of a Man altogether like one of ours, aswel in the exterior figure of its members, as in the interior conformity of its organs ; without framing it of other matter then of that which I had described ; and without putting in it at the beginning any reasonable soul, or any other thing to serve therein for a vegetative or sensitive soul ; unless he stirr'd up in his heart one of those fires without light which I had already discovered ; and that I conceiv'd of no other nature but that which heats hay when its housed before it be dry, or which causeth new Wines to boyl when it works upon the rape : For examining the functions which might be consequently in this body, I exactly found all those which may be in us, without our thinking of them ; and to which our soul (that is to say, that distinct part from our bodies, whose nature (as hath been said before) is onely to think) consequently doth not contribute, and which are all the same

same wherein we may say unreason-
able creatures resemble us. Yet could
I not finde any, of those which de-
pending from the thought, are the
onely ones which belong unto us as
Men; whereas I found them all after-
wards, having supposed that God
created a reasonable soul, and that he
joyn'd it to this body, after a certain
manner which I describ'd.

But that you might see how I treat-
ed this matter, I shall here present
you with the explication of the mo-
tion of the heart, and of the arteries,
which being the first and most gene-
ral (which is observed in animals) we
may thereby easily judge what we
ought to think of all the rest. And
that we may have the less difficulty to
understand what I shall say thereof,
I wish those who are not versed in A-
natomy, would take the pains, before
they read this, to cause the heart of
some great animal which hath lungs,
to be dissected; for in all of them its
very like that of a Man: and that
they

they may have shewn them the two
 cels or concavities which are there:
 First that on the right side, whereto
 two large conduits answer, to wit,
 the *vena cava*, which is the principal
 receptacle of blood, and as the body
 of a tree, whereof all the other veins
 of the body are branches; and the ar-
 terious vein, which was so mis-call'd,
 because that in effect its an artery,
 which taking its *origine* from the
 heart, divides it self after being come
 forth, into divers branches, which eve-
 ry way spred themselves through the
 lungs. Then the other which is on
 the left side, whereunto in the same
 manner two pipes answer, which are
 as large, or larger then the former; to
 wit, the veinous artery, which was
 also il named, forasmuch as its nothing
 else but a vein which comes from the
 lungs, where its divided into several
 branches interlaid with those of the
 arterious vein, and those of that pipe
 which is called the Whistle, by which
 the breath enters. And the great ar-
 tery

tery, which proceeding from the heart, disperſeth its branches thorow all the body. I would alſo that they would carefully obſerve the eleven little ſkins, which, as ſo many little doors, open and ſhut the four openings which are in theſe two concavities; to wit, three at the entry of the *vena cava*, where they are ſo diſpoſed, that they can no wayes hinder the blood which it contains from running into the right concavity of the heart; and yet altogether hinder it from coming out. Three at the entry of the arterious vein; which being diſpoſed quite contrary, permit only the blood which is in that concavity to paſs to the lungs; but not that which is in the lungs to return thither. And then two others at the entry of the veinous artery, which permits the blood to run to the left concavity of the heart, but oppoſeth its return. And three at the entry of the great artery, which permit it to go from the heart, but hinder its return thither. Neither
need

need we seek any other reason for the number of these skins, save only that the opening of the veinous artery, being oval-wise, by reason of its situation, may be fitly shut with two; whereas the other, being round, may the better be clos'd with three. Besides, I would have them consider, that the great artery and the arterious vein are of a composition much stronger then the veinous artery or the *vena cava*. And that these two later grow larger before they enter into the heart, and make (as it were) two purses, call'd the ears of the heart, which are composed of a flesh like it; and that there is always more heat in the heart then in any other part of the body. And in fine, that if any drop of bloud enter into these concavities, this heat is able to make it presently swell and dilate it self, as generally all liquors do, when drop by drop we let them fall into a very hot vessel.

For after this I need say no more for
to

to unfold the motion of the heart, but that when these concavities are not full of blood, necessarily there runs some from the *vena cava* into the right, and from the veinous artery into the left; for that these two vessels are always full of it, and that their openings which are towards the heart cannot then be shut: But that as soon as there is thus but two drops of blood entered, one in either of these concavities, these drops, which cannot but be very big, by reason that their openings whereby they enter are very large, and the vessels whence they come very full of blood, are rarified and dilated because of the heat which they find therein. By means whereof, causing all the heart to swell, they drive and shut the five little doors which are at the entry of the two vessels whence they come, hindering thereby any more blood to fall down into the heart, and continuing more and more to rarifie themselves, they drive and open the six other little doors

doors which are at the entry of the other two vessels whence they issue, causing by that means all the branches of the arterious vein, and of the great artery, to swell (as it were) at the same time with the heart: which presently after falls, as those arteries also do, by reason that the blood which is entered therein grows colder, and their six little doors shut up again, and those five of the *vena cava*, and of the veinous artery open again, and give way to two other drops of blood, which again swell the heart and the arteries in the same manner as the preceding did. And because the blood which thus enters into the heart, passeth thorow those two purses, which are call'd the ears; thence it comes, that their motion is contrary to the heart's, and that they fall when that swells:

Lastly, That they who know not the force of Mathematical demonstrations, and are not accustomed to distinguish true reasons from probable ones, may not venture to deny this
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without examining it, I shall advertise them, that this motion which I have now discovered, as necessarily follows from the onely disposition of the organs (which may plainly be seen in the heart,) and from the heat (which we may feel with our fingers,) and from the nature of the bloud (which we may know by experience,) as the motions of a clock doth by the force, situation and figure of its weight and wheels.

But if it be asked, how it comes that the bloud of the veins is not exhausted, running so continually into the heart; and how that the arteries are not too full, since all that which passeth thorow the heart dischargeth it self into them: I need answer nothing thereto but what hath been already writ by an English Physician, to whom this praise must be given, to have broken the ice in this place, and to be the first who taught us, That there are several little passages in the extremity of the arteries whereby the

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bloud

bloud which they receive from the heart, enters the little branches of the veins; whence again it sends it self back towards the heart: so that its course is no other thing but a perpetuall circulation. Which he very well proves by the ordinary experience of Chirurgians, who having bound the arm indifferently hard above the the place where they open the vein, which causeth the bloud to issue more abundantly, then if it had not been bound. And the contrary would happen, were it bound underneath, between the hand and the incision, or bound very hard above. For its manifest, that the band indifferently tyed, being able to hinder the bloud which is already in the arm to return towards the heart by the veins; yet it therefore hinders not the new from coming always by the arteries, by reason they are placed under the veins, and that their skin being thicker, are less easie to be press'd; as also that the bloud which comes from the heart

heart, seeks more forcibly to passe by them towards the hand, then it doth to return from thence towards the heart by the veins. And since this bloud which issues from the arm by the incision made in one of the veins, must necessarily have some passage under the bond, to wit, towards the extremities of the arm, whereby it may come thither by the arteries, he also proves very well what he sayes of the course of the bloud through certain little skins, which are so disposed in divers places along the veins, which permit it not to pass from the middle towards the extremities, but onely to return from the extremities towards the heart. And besides this, experience shews, That all the bloud which is in the body may in a very little time run out by one onely artery's being cut, although it were even bound very neer the heart, and cut betwixt it and the ligature : So that we could have no reason to imagine that the bloud which issued thence

could come from any other part.

But there are divers other things which witness, that the true cause of this motion of the bloud is that which I have related. As first, The difference observed between that which issues out of the veins, and that which comes out of the arteries, cannot proceed but from its being rarified and (as it were) distilled by passing thorow the heart : its more subtil, more lively, and more hot presently after it comes out ; that is to say, being in the arteries, then it is a little before it enters them, that is to say, in the veins. And if you observe, you will finde, that this difference appears not well but about the heart ; and not so much in those places which are farther off. Next, the hardnesse of the skin of which the artery vein and the great artery are composed, sheweth sufficiently, that the bloud beats against them more forcibly then against the veins. And why should the left concavity of the heart, and the
great

great artery be more large and ample then the right concavity, and the arterious vein; unless it were that the blood of the veinous artery, having bin but onely in the lungs since its passage thorow the heart, is more subtil, and is rarified with more force and ease then the blood which immediately comes from the *vena cava*. And what can the Physicians divine by feeling of the pulse, unlesse they know, that according as the blood changeth its nature, it may by the heat of the heart be rarified to be more or lesse strong, and more or lesse quick then before. And if we examine how this heat is communicated to the other members, must we not avow that 'tis by means of the blood, which passing the heart, reheats it self there, and thence disperseth it self thorow the whole body: whence it happens, that if you take away the blood from any part, the heat by the same means also is taken away. And although the heart were as burning as hot iron, it

were not sufficient to warm the feet and the hands so often as it doth, did it not continue to furnish them with new blood.

Besides, from thence we know also that the true use of respiration is to bring fresh air enough to the lungs, to cause that blood which comes from the right concavity of the heart, where it was rarified, and (as it were) ch:ng'd into vapours, there to thicken, and convert it self into blood again, before it fall again into the left, without which it would not be fit to serve for the nourishment of the fire which is there. Which is confirm'd, for that its seen, that animals which have no lungs have but one onely concavity in the heart; and that children, who can make no use of them when they are in their mothers bellies, have an opening, by which the blood of the *vena cava* runs to the left concavity of the heart, and a conduit by which it comes from the arterious vein into the great artery without

out passing the lungs.

Next, How would the concoction be made in the stomach, unlesse the heart sent heat by the arteries, and therewithall some of the most fluid parts of the bloud, which help to dissolve the meat receiv'd therein? and is not the act which converts the juice of these meats into bloud easie to be known, if we consider, that it is distill'd by passing and repassing the heart, perhaps more then one or two hundred times a day? And what need we ought else to explain the nutrition and the production of divers humours which are in the body, but to say, that the force wherewith the bloud in rarifying it self, passeth from the heart towards the extremities of the arteries, causeth some of its parts to stay amongst those of the members where they are, and there take the place of some others, which they drive from thence? And that according to the situation, or the figure, or the smalnesse of the pores which they

meet, some arrive sooner in one place then others. In the same manner as we may have seen in severall sieves, which being diversly pierc'd, serve to sever divers grains one from the other. And briefly, that which is most remarkable herein, is the generation of the animal spirits, which are as a most subtil wind, or rather, as a most pure and lively flame, which continually rising in great abundance from the heart to the brain, dischargeth it self thence by the nerves into the muscles, and gives motion to all the members ; without imagining any other reason which might cause these parts of the bloud, which being most mov'd, and the most penetrating, are the most fit to form these spirits, tend rather towards the brain, then to any other part. Save onely that the arteries which carry them thither, are those which come from the heart in the most direct line of all : And that according to the rules of the Mechanics, which are the same with those
of

of Nature , when divers things together strive to move one way, where there is not room enough for all ; so those parts of bloud which issue from the left concavity of the heart tend towards the brain, the weaker and less agitated are expell'd by the stronger, who by that means arrive there alone.

I had particularly enough expounded all these things in a Treatise which I formerly had design'd to publish : In pursuit whereof, I had therein shewed what ought to be the fabric of the nerves and muscles of an humane body, to cause those animall spirits which were in them, to have the power to move those members. As we see that heads a while after they are cut off, yet move of themselves, and bite the ground, although they are not then animated. What changes ought to be made in the brain to cause waking, sleeping, and dreaming : how light, sounds, smells, tastes, heat, and all other qualities of exterior objects, might imprint severall

Ideas

Ideas by means of the senses. How hunger and thirst, and the other interior passions might also send theirs thither. What ought to be taken therein for common sense, where these *Ideas* are received; for memory which preserves them; and for fancy, which can diversly change them, and form new ones of them; and by the same means, distributing the animal spirits into the muscles, make the members of the body move in so many severall fashions, and as fitly to those objects which present themselves to its senses; and to the interior passions which are in them, as ours may move themselves without the consent of the Wil. Which wil seem nothing strange to those, who knowing how many *Automatas* or moving Machines the industry of men can make, employing but very few pieces, in comparison of the great abundance of bones, muscles, nerves, arteries, veins, and all the other parts which are in the body of every Animal, will consider

sider this body as a fabrick, which having been made by the hands of God, is incomparably better ordered, and hath more admirable motions in it then any of those which can be invented by men. And herein I particularly insisted, to make it appear, that if there were such Machines which had organs, and the exteriour figure of an Ape, or of any other unreasonable creature, we should finde no means of knowing them not to be altogether of the same nature as those Animals : whereas, if there were any which resembled our bodies, and imitated our actions as much as morally it were possible, we should always have two most certain ways to know, that for all that they were not reall men : The first of which is, that they could never have the use of speech, nor of other signes in framing it, as we have, to declare our thoughts to others : for we may well conceive, that a Machine may be so made, that it may utter words, and even some proper to the
cor.

corporal actions, which may cause some change in its organs; as if we touch it in some part, and it should ask what we would say; or so as it might cry out that one hurts it, and the like: but not that they can diversifie them to answer sensibly to all what shall be spoken in its presence, as the dullest men may do. And the second is, That although they did divers things aswel, or perhaps better, then any of us, they must infallibly fail in some others, whereby we might discover that they act not with knowledge, but onely by the disposition of their organs: for whereas Reason is an universal instrument which may serve in all kinde of encounters, these organs have need of some particular disposition for every particular action: whence it is, that its morally impossible for one Machine to have severall organs enough to make it move in all the occurrences of this life, in the same manner as our Reason makes us move. Now by these two means
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we may also know the difference which is between Men and Beasts: For 'tis a very remarkable thing, that there are no men so dull and so stupid, without excepting those who are out of their wits, but are capable to rank severall words together, and of them to compose a Discourse, by which they make known their thoughts: and that on the contrary, there is no other creature, how perfect or happily soever brought forth, which can do the like. The which happens, not because they want organs; for we know, that Pyes and Parrots can utter words even as we can, and yet cannot speak like us; that is to say, with evidence that they think what they say. Whereas Men, being born deaf and dumb, and deprived of those organs which seem to make others speak, as much or more then beasts, usually invent of themselves to be understood by those, who commonly being with them, have the leisure to learn their expressions.

And

And this not onely witnesseth, that Beasts have lesse reason than men, but that they have none at all. For we see there needs not much to learn to speak : and forasmuch as we observe inequality amongst Beasts of the same kind, aswell as amongst men, and that some are more easily managed then others ; 'tis not to be believed, but that an Ape or a Parrot which were the most perfect of its kinde, should therein equall the most stupid child, or at least a child of a distracted brain, if their souls were not of a nature wholly different from ours. And we ought not to confound words with naturall motions, which witness passions, and may be imitated by Machines aswell as by Animals ; nor think (as some of the Ancients) that beasts speak, although we do not understand their language : for if it were true, since they have divers organs which relate to ours, they could aswell make themselves understood by us, as by their like. Its likewise very
 remark-

remarkable, that although there are divers creatures which expresse more industry then we in some one of their actions ; yet we may well perceive, that the same shew none at all in many others : So that what they do better then we , proves not at all that they have reason ; for by that reckoning they would have more then any of us, and would do better in all other things ; but rather, that they have none at all, and that its Nature onely which works in them according to the disposition of their organs. As wee see a Clock, which is onely composed of wheels and springs, can reckon the hours, and measure the times more exactly then we can with all our prudence.

After this I had described the reasonable Soul, and made it appear, that it could no ways be drawn from the power of the Matter, as other things whereof I had spoken ; but that it ought to have been expressly created : And how it suffiseth not for it to be
lodg'd

lodg'd in our humane body as a Pilot in his ship, to move its members one-ly; but also that its necessary it be joyned and united more strongly therewith to have thoughts and appetites like ours, and so make a reall man.

I have here dilated my self a little on the subject of the Soul, by reason 't is of most importance ; for, next the error of those who deny God, which I think I have already sufficiently confuted, there is none which sooner estrangeth feeble minds from the right way of vertue, then to imagine that the soul of beasts is of the same nature as ours, and that consequently we have nothing to fear nor hope after this life, no more then flies or ants. Whereas, when we know how different they are, we comprehend much better the reasons which prove that ours is of a nature wholly independing from the body, and consequently that it is not subject to die with it. And that when we see no
other

other cause which destroys it, we are naturally thence moved to judge that it's immortall.



PART. VI.

ITs now three years since I ended the Treatise which contains all these things, and that I began to review it, to send it afterwards to the Presse, when I understood, that persons to whom I submit, and whose authority can no lesse command my actions, then my own Reason doth my thoughts, had disapproved an opinion in Physicks, published a little before by another ; of which I will not say that I was, but that indeed I had observed nothing therein, before their censure, which I could have imagined prejudiciall either to Religion or the State ; or consequently,

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which

which might have hindred me from writing the same, had my Reason perswaded mee thereto. And this made me fear, lest in the same manner there might be found some one amongst mine, in which I might have been mistaken; notwithstanding the great care I always had to admit no new ones into my belief, of which I had not most certain demonstrations; and not to write such as might turn to the disadvantage of any body. Which was sufficient to oblige me to change my resolution of publishing them. For although the reasons for which I had first of all taken it, were very strong; yet my inclination, which alwayes made me hate the trade of Book-making, presently found me out others enough to excuse my self from it. And these reasons on the one and other side are such, that I am not only somewhat concern'd to speak them; but happily the Publick also to know them.

I never did much esteem those things

things which proceeded from mine own brain; and so long as I have gathered no other fruits from the Method I use, but onely that I have satisfied my self in some difficulties which belong to speculative Sciences, or at least endeavoured to regulate my Manners by the reasons it taught me, I thought my self not obliged to write any thing of them. For, as for what concerns Manners, every one abounds so much in his own sense, That we may finde as many Reformers as heads, were it permitted to others, besides those whom God hath established as Sovereigns over his people, or at least, to whom he hath dispensed grace and zeal enough to be Prophets, to undertake the change of any thing therein. And although my Speculations did very much please me, I did beleieve that other men also had some, which perhaps pleas'd them more. But as soon as I had acquired some generall notions touching naturall Philosophy,

and beginning to prove them in divers particular difficulties, I observed how far they might lead a man, and how far different they were from the principles which to this day are in use; I judg'd, that I could not keep them hid without highly sinning against the Law, which obligeth us to procure, as much as in us lies, the general good of all men. For they made it appear to me, that it was possible to attain to points of knowledge, which may be very profitable for this life: and that in stead of this speculative Philosophy, which is taught in the Schools, we might finde out a practicall one, by which knowing the force and workings of Fire, Water, Air, of the Starrs, of the Heavens, and of all other Bodies which environ us, distinctly, as we know the severall trades of our Handicrafts, we might in the same manner employ them to all uses to which they are fit, and so become masters and possessours of Nature. Which is not onely to be desired for
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the invention of very many expedients of Arts, which without trouble might make us enjoy the fruits of the earth, and all the conveniencies which are to be found therein : But chiefly also for the preservation of health, which (without doubt) is the first good, and the foundation of all other good things in this life. For even the minde depends so much on the temper and disposition of the organs of the body, that if it be possible to finde any way of making men in the generall wiser, and more able then formerly they were, I beleeve it ought to be sought in Physick. True it is, that which is now in use contains but few things, whose benefit is very remarkable : But (without any designe of slighting of it) I assure my self, there is none, even of their own profession, but will consent, that whatsoever is known therein, is almost nothing in comparison of what remains to be known. And that we might be freed from very many diseases, as well

of the body as of the mind, and even also perhaps from the weakneses of old age, had we but knowledge enough of their Causes, and of all the Remedies wherewith Nature hath furnished us. Now having a designe to employ all my life in the enquiry of so necessary a Science; and having found a way, the following of which me thinks might infallibly lead us to it, unless we be hindred by the shortness of life, or by defect of experiments. I judg'd that there was no better Remedy against those two impediments, but faithfully to communicate to the publique, all that little I should discover, and to invite all good Wits to endeavour to advance farther in contributing every one, according to his inclination and power, to those Experiments which are to be made, and communicating also to the publique all the things they should learn; so that the last, beginning where the precedent ended, and so joyning the lives and labors of many in one, we might

might all together advance further then any particular Man could do.

I also observ'd touching Experiments, that they are still so much the more necessary, as we are more advanc'd in knowledg. For in the beginning it's better to use those only which of themselves are presented to our senses, and which we cannot be ignorant of, if we do but make the least reflections upon them, then to seek out the rarest and most studied ones. The reason whereof is, that those which are rarest, doe often deceive, when we seldome know the same of the most common ones, and that the circumstances on which they depend, are, as it were, always so particular, and so small, that it's very uneasy to finde them out. But the order I observed herein was this. First, I endeavoured to finde in generall the Principles or first Causes of whatsoever is or may be in the world, without considering any thing for this end, but God alone who created it, or

drawing them elsewhere, then from certain seeds of Truth which naturally are in our souls. After this, I examined what were the first and most ordinary Effects which might be deduced from these Causes: And me thinks that thereby I found out Heavens, Starrs, an Earth; and even on the Earth, Water, Air and Fire, Minerals, and some other such like things, which are the most common, and the most simple of all, and consequently the most easie to be understood. Afterwards, when I would descend to those which were more particular, there were so many severall ones presented themselves to me, that I did beleieve it impossible for a humane understanding to distinguish the forms and species of Bodies which are on the earth, from an infinite number of others which might be there, had it been the will of God so to place them: Nor by consequence to apply them to our use, unless we set the Effects before the Causes, and
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make use of divers particular experiments; In relation to which, revolving in my minde all those objects which ever were presented to my senses, I dare boldly say, I observed nothing which I could not fitly enough explain by the principles I had found. But I must also confesse that the power of Nature is so ample and vast, and these principles are so simple and generall, that I can observe almost no particular Effect, but that I presently know it might be deduced from thence in many severall ways: and that commonly my greatest difficulty is to finde in which of these ways it depends thereon; for I know no other expedient for that, but again to seek some experiments, which may be such, that their event may not be the same, if it be in one of those ways which is to be exprest, as if it were in another. In fine, I am gotten so far, That (me thinks) I see well enough what course we ought to hold to make the most part of those experiments

riments which may tend to this effect. But I also see they are such, and of so great a number, that neither my hands nor my estate (though I had a thousand times more then I have) could ever suffice for all. So that according as I shall hereafter have conveniency to make more or fewer of them, I shall also advance more or lesse in the knowledge of Nature, which I hop'd I should make known by the Treatise which I had written; and therein so clearly shew the benefit which the Publick may receive thereby, that I should oblige all those in general who desire the good of Mankinde; that is to say, all those who are indeed virtuous, (and not so seemingly, or by opinion only) as well to communicate such experiments as they have already made, as to help me in the enquiry of those which are to be made.

But since that time, other reasons have made me alter my opinion, and think that I truly ought to continue
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to write of all those things which I judg'd of any importance, according as I should discover the truth of them, and take the same care, as if I were to print them; as well that I might have so much the more occasion thoroughly to examine them; as without doubt, we always look more narrowly to what we offer to the publick view, then to what we compose onely for our own use: and oftentimes the same things which seem'd true to me when I first conceived them, appear'd afterwards false to me, when I was committing them to paper: as also that I might lose no occasion of benefiting the Publick, if I were able, and that if my Writings were of any value, those to whose hands they should come after my death, might to make what use of them they think fit.

But that I ought not any wayes to consent that they should be published during my life; That neither the opposition and controversies, whereto perhaps

perhaps they might be obnoxious, nor even the reputation whatsoever it were, which they might acquire me, might give me any occasion of mispending the time I had design'd to employ for my instruction; for although it be true that every Man is oblig'd to procure, as much as in him lies, the good of others; and that to be profitable to no body, is properly to be good for nothing: Yet it's as true, that our care ought to reach beyond the present time; and that it were good to omit those things which might perhaps conduce to the benefit of those who are alive, when our designe is, to doe others which shall prove farr more advantageous to our posterity; As indeed I desire it may be known that the little I have learnt hitherto, is almost nothing in comparison of what I am ignorant of; and I doe not despair to be able to learn: For it's even the same with those, who by little and little discover the truth in Learning; as with those who begin-

ginning to grow rich, are less troubled to make great purchases, then they were before when they were poorer, to make little ones. Or else one may compare them to Generals of Armies, whose Forces usually encrease proportionably to their Victories; and who have need of more conduct to maintain themselves after the loss of a battail, then after the gaining one, to take Towns and Provinces. For to endeavour to overcome all the difficulties and errours which hinder us to come to the knowledg of the Truth, is truly to fight battails. And to receive any false opinion touching a generall or weighty matter, is as much as to lose one; there is far more dexterity required to recover our former condition, then to make great progresses where our Principles are already certain. For my part, if I formerly have discovered some Truths in Learning, as I hope my Discourse will make it appear I have, I may say, they are but
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the products and dependances of five or six principall difficulties which I have overcome, and which I reckon for so many won Battails on my side. Neither will I forbear to say; That I think, It's only necessary for me to win two or three more such, wholly to perfect my design. And that I am not so old, but according to the ordinary course of Nature, I may have time enough to effect it. But I beleeve I am so much the more obliged to husband the rest of my time, as I have more hopes to employ it well; without doubt, I should have divers occasions of impeding it; should I publish the grounds of my Physicks. For although they are almost all so evident, that to beleeve them, it's needfull onely to understand them; and that there is none whereof I think my self unable to give demonstration. Yet because it's impossible that they should agree with all the severall opinions of other men, I foresee I should often be diverted by the
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the opposition they would occasion.

It may be objected, These oppositions might be profitable, as well to make me know my faults, as if any thing of mine were good to make others by that means come to a better understanding thereof; and as many may see more then one man, beginning from this time to make use of my grounds, they might also help me with their inventions. But although I know my self extremely subject to fail, and do never almost trust my first thoughts; yet the experience I have of the objections which may be made unto me, hinder me from hoping for any profit from them; For I have often tried the judgments as well of those whom I esteem'd my friends, as of others whom I thought indifferent, and even also of some, whose malignity and envie did sufficiently discover what the affection of my friends might hide. But it seldom happened that any thing was objected against me, which I had not altogether foreseen,

seen, unless it were very remote from my Subject: So that I never almost met with any Censurer of my opinions, that seemed unto me either less rigorous, or less equitable then my self. Neither did I ever observe, that by the disputations practised in the Schools any Truth which was formerly unknown, was ever discovered. For whilst every one seeks to overcome, men strive more to maintain probabilities, then to weigh the reasons on both sides; and those who for a long time have been good Advocates, are not therefore the better Judges afterwards.

As for the benefit which others may receive from the communication of my thoughts, it cannot also be very great, forasmuch as I have not yet perfected them, but that it is necessary to add many things thereunto, before a usefull application can be made of them. And I think I may say without vanity, That if there be any one capable thereof, it must be my self,

self, rather than any other. Not but that there may be divers wits in the world incomparably better than mine ; but because men cannot so well conceive a thing and make it their own, when they learn it of another, as when they invent it themselves : which is so true in this Subject, that although I have often explain'd some of my opinions to very understanding men, and who, whilst I spake to them, seem'd very distinctly to conceive them ; yet when they repeated them, I observ'd, that they chang'd them almost always in such a manner, that I could no longer own them for mine. Upon which occasion, I shall gladly here desire those who come after me, never to beleieve those things which may be delivered to them for mine, when I have not published them my self. And I do not at all wonder at the extravagancies which are attributed to all those ancient Philosophers, whose Writings we have not ; neither do I

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thereby judge, that their thoughts were very irrationall, seeing they were the best Wits of their time; but onely that they have been ill convey'd to us: as it appears also, that never any of their followers surpass'd them. And I assure my self, that the most passionate of those, who now follow *Aristotle*, would beleieve himself happy, had he but as much knowledge of Nature as he had, although it were on condition that he never might have more: They are like the ivie, which seeks to climb no higher then the trees which support it, and ever after tends downwards again when it hath attain'd to the height thereof: for, me thinks also, that such men sink downwards; that is to say, render themselves in some manner lesse knowing, then if they did abstain from studying; who being not content to know all which is intelligibly set down in their Authour, will besides that, finde out the solution of divers difficulties of which he
says

says nothing, and perhaps never thought of them : yet their way of Philosophy is very fit for those who have but mean capacities : For the obscurity of the distinctions and principles which they use causeth them to speak of all things as boldly, as if they knew them, and maintain all which they say, against the most subtile and most able ; so that there is no means left to convince them. Wherein they seem like to a blinde man, who, to fight without disadvantage against one that sees, should challenge him down into the bottom of a very dark cellar : And I may say, that it is these mens interest, that I should abstain from publishing the principles of the Philosophy I use, for being most simple and most evident, as they are, I should even do the same in publishing of them, as if I opened some windows, to let the day into this cellar, into which they go down to fight. But even the best Wits have no reason to wish for the knowledge of them : for

if they will be able to speak of all things, and acquire the reputation of being learned, they will easily attain to it by contenting themselves with probability, which without much trouble may be found in all kinde of matters; then in seeking the Truth, which discovers it self but by little and little, in some few things; and which, when we are to speak of others, oblige us freely to confesse our ignorance of them. But if they prefer the knowledge of some few truths to the vanity of seeming to be ignorant of nothing, as without doubt they ought to do, and will undertake a desigue like mine, I need not tell them any more for this purpose, but what I have already said in this Discourse: For if they have a capacity to advance farther then I have done, they may with greater consequence finde out of themselves whatsoever I think I have found: Forasmuch as having never examined any thing but by order, it's certain,

tain, that what remains yet for me to discover, is in it self more difficult and more hid, then what I have already here before met with; and they would receive much lesse satisfaction in learning it from me, then from themselves. Besides that, the habit which they would get by seeking first of all the easie things, and passing by degrees to others more difficult, will be more usefull to them, then all my instructions. As I for my part am perswaded, that had I been taught from my youth all the Truths whose demonstrations I have discovered since, and had taken no pains to learn them, perhaps I should never have known any other, or at least, I should never have acquired that habit, and that faculty which I think I have, still to finde out new ones, as I apply my self to the search of them. And in a word, if there be in the world any work which cannot be so well ended by any other, as by the same who began it, it's that which I am now about.

It's true, That one man will not be sufficient to make all the experiments which may conduce thereunto : But withall, he cannot profitably imploy other hands then his own, unlesse it be those of Artists, or others whom he hires, and whom the hope of profit (which is a very powerfull motive) might cause exactly to do all those things he should appoint them : For as for voluntary persons, who by curiosity or a desire to learn, would perhaps offer themselves to his help, besides that commonly they promise more then they perform, and make onely fair propositions, whereof none ever succeeds, they would infallibly be paid by the solution of some difficulties, or at least by complements and unprofitable entertainments, which could not cost him so little of his time, but he would be a loser thereby. And for the Experiments which others have already made, although they would even communicate them to him, (which those who call them Secrets

crets would never do,) they are for the most part composed of so many circumstances, or superfluous ingredients, that it would be very hard for him to decypher the truth of them: Besides, he would find them all so ill exprest, or else so false, by reason that those who made them have laboured to make them appear conformable to their principles; that if there were any which served their turn, they could not at least be worth the while which must be employed in the choice of them. So that, if there were any in the world that were certainly known to be capable of finding out the greatest things, and the most profitable for the Publick which could be, and that other men would therefore labour alwayes to assist him to accomplish his Designes; I do not conceive that they could do more for him, then furnish the expence of the experiments whereof he stood in need; and besides, take care only that he may not be by any body hindred

of his time. But besides that, I do not presume so much of my Self, as to promise any thing extraordinary, neither do I feed my self with such vain hopes, as to imagine that the Publick should much interesse it self in my designs; I have not so base a minde, as to accept of any favour whatsoever, which might be thought I had not deserved.

All these considerations joyned together, were the cause three years since why I would not divulge the Treatise I had in hand; and which is more, that I resolved to publish none whilst I lived, which might be so general, as that the Grounds of my Philosophy might be understood thereby. But since, there hath been two other reasons have obliged me to put forth some particular Essays, and to give the Publick some account of my Actions and Designs. The first was, that if I failed therein, divers who knew the intencion I formerly had to print some of my Writings, might
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imagine that the causes for which I
 forbore it, might be more to my dis-
 advantage then they are. For al-
 though I do not affect glory in excess;
 or even, (if I may so speak) that I hate
 it, as far as I judge it contrary to my
 rest, which I esteem above all things:
 Yet also did I never seek to hide my
 actions as crimes, neither have I been
 very wary to keep my self unknown;
 as well because I thought I might
 wrong my self, as that it might in
 some manner disquiet me, which
 would again have been contrary to the
 perfect repose of my minde which I
 seek. And because having alwayes
 kept my self indifferent, caring not
 whether I were known or no, I could
 not chuse but get some kinde of re-
 putation, I thought that I ought to
 do my best to hinder it at least from
 being ill. The other reason which
 obliged me to write this, is, that ob-
 serving every day more and more the
 designe I have to instruct my self, re-
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ber of experiments which are needful to me, and which its impossible for me to make without the help of others ; although I do not so much flatter my self, as to hope that the Publick, shares much in my concerns ; yet will I not also be so much wanting to my self, as to give any cause to those who shall survive me, to reproach this, one day to me, That I could have left them divers things far beyond what I have done, had I not too much neglected to make them understand wherein they might contribute to my designe.

And I thought it easie for me to choose some matters, which being not subject to many Controversies, nor obliging me to declare any more of my Principles then I would willingly, would neverthelesse expresse clearly enough, what my abilities or defects are in the Sciences. Wherein I cannot say whether I have succeeded or no ; neither will I prevent the judgment of any man by speaking of my own
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Writings : but I should be glad they might be examin'd ; and to that end I beseech all those who have any objections to make, to take the pains to send them to my Stationer, that I being advertised by him, may endeavour at the same time to adjoyn my Answer thereunto : and by that means, the Reader seeing both the one and the other, may the more easily judge of the Truth. For I promise, that I will never make any long Answers, but only very freely confesse my own faults, if I find them ; or if I cannot discover them, plainly say what I shall think requisite in defence of what I have writ, without adding the explanation of any new matter, that I may not endlessly engage my self out of one into another.

Now if there be any whereof I have spoken in the beginning, of the Opticks and of the Meteors, which at first jarr, by reason that I call them Suppositions, and that I seem not willing to prove them ; let a man have but the
 patience

tience to read the whole attentively, and I hope he will rest satisfied: For (me thinks) the reasons follow each other so closely, that as the later are demonstrated by the former, which are their Causes; the former are reciprocally proved by the later, which are their Effects. And no man can imagine that I herein commit the fault which the Logicians call a *Circle*; for experience rendring the greatest part of these effects most certain, the causes whence I deduce them serve not so much to prove, as to explain them; but on the contrary, they are those which are proved by them. Neither named I them Suppositions, that it might be known that I conceive my self able to deduce them from those first Truths which I have before discovered: But that I would not expressly do it to crosse certain spirits, who imagine that they know in a dayal what another may have thought in twenty yeers, as soon as he hath told them but two or three words; and

and who are so much the more subject to erre, and less capable of the Truth, as they are more quick and penetrating) from taking occasion of erecting some extravagant Philosophy on what they may beleeve to be my Principles, and lest the fault should be attributed to me. For as for those opinions which are wholly mine, I excuse them not as being new, because that if the reasons of them be seriously considered, I assure my self, they will be found so plain, and so agreeable to common sense, that they will seem less extraordinary and strange then any other which may be held on the same Subjects. Neither do I boast that I am the first Inventor of any of them; but of this indeed, that I never admitted any of them, neither because they had, or had not been said by others, but only because Reason perswaded me to them.

If Mechanicks cannot so soon put in practise the Invention which is set forth in the Opticks, I beleeve that
therefore

therefore men ought not to condemn it; forasmuch as skill and practice are necessary for the making and completing the Machines I have described; so that no circumstance should be wanting. I should no less wonder if they should succeed at first triall, then if a man should learn in a day to play excellently well on a Lute, by having an exact piece set before him. And if I write in French, which is the language of my Country, rather then in Latin, which is that of my Tutors, 'tis because I hope such who use their meer naturall reason, wil better judge of my opinions, then those who only beleeeve in old Books. And for those who joyn a right understanding with study, (who I only wish for my Judges) I assure my self, they will not be so partiall to the Latin, as to refuse to read my reasons because I expresse them in a vulgár tongue.

To conclude, I will not speak here in particular of the progresse I hoped to make hereafter in Learning; Nor
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engage my self by any promise to the Publick, which I am not certain to perform. But I shall onely say, That I am resolved to employ the remainder of my life in no other thing but the study to acquire some such knowledge of Nature as may furnish us with more certain rules in Physick then we hitherto have had : And that my inclination drives me so strongly from all other kind of designs, chiefly from those which cannot be profitable to any, but by prejudicing others; that if any occasion obliged me to spend my time therein, I should beleeve I should never succeed therein : which I here declare, though I well know it conduceth not to make me considerable in the world; neither is it my ambition to be so. And I shall esteem my self always more obliged to those by whose favour I shal without disturbance enjoy my ease, then to them who should proffer me the most honourable imployment of the earth.

F I N I S.

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26. Formation of Church 1720

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